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GEOGRAPHIC INFLUENCES IN THE DEVELOPMENT OF NEBRASKA

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THE salient cultural features in the development of Nebraska are as follows:

1. Settlement began in the eastern part of the state (then a territory), extended west, first, along valleys, and later, onto the intervening uplands.
2. Development, though rapid as a whole, has been by periods of progress and depression, especially in the western part.
3. Development has been largely agricultural, varying considerably in each of four well-defined regions.
4. The state is very unevenly developed.
5. The state has one small coal mine, several sand dredges, brick yards, and quarries, but no gold, silver or iron mines.
6. The state ranks high in the production of corn, oats, wheat, alfalfa, prairie hay, horses, cattle, butter and meats.
7. Most of the people and the largest cities are in the eastern and southern counties.
8. The smallest counties are in the eastern part and largest in the northwest.
9. The southeast half of the State is well supplied with local-use railroads. There are four trans-continental railroads in Nebraska.
10. In politics the state often separates into north and south divisions and there is more or less misunderstanding between the eastern and western parts.

How are the above facts explained? To use a common expression in geography, how are they accounted for? Do they have any definite relations to physical features? If so, what are the geographic influences in Nebraska? I will briefly describe the position, climate, topography, and soils as the influencing conditions and point out a few of their consequences.

Position of the State

Nebraska is centrally located in the mainland of the United States, being a part of the long slope of the High Plains Regions, slanting eastward from the Rocky Mountains. It is alongside the Missouri-Mississippi highway and in the path of the well-known overland routes. Such a position and the advantages coming from it have advertised the state and made its products readily accessible to eastern, southern, and foreign markets. The position with respect to boundaries, climatic belts, etc., need not be recited in this connection.

Early Development

The state was occupied by Indians before whites. The Indians are said to have entered from the east, by way of the water courses at various periods, beginning about the time of the discovery of America by Columbus. They lived mostly in the eastern part of the state, their crude homes being in valleys near trees and water. They cultivated small fields, and made regular pilgrimages to unoccupied valleys, upland plains and table lands to hunt elk, bison, and antelopes, which were their principal sources of food and clothing. Certain nomadic tribes finally occupied the open plains nearly exclusively and warred against those who came to this country only for hunting. Indians did not strongly resist the advent of whites.

The first white people to reach Nebraska were trappers and traders. They entered from the southeast by way of the Missouri river. Next came a few "squatters" or settlers from the same direction, and across Iowa. By this time navigation on the Missouri had grown to considerable importance.

At this stage of Nebraska's development, came the discovery of gold in California. The Missouri was navigable to the Nebraska border; beyond was the shallow Platte. Prospectors were here forced to seek freight and stage routes across the land, leading westward from the Missouri-Mississippi gateway, up and over the Great Plains to low divides in the Rocky Mountains and beyond. The line of easiest access in the north was, in general, along the Platte Valley. So this natural feature had a marked influence in the movement of early freight, emigrants, and finally in locating the Union Pacific. Upon the completion of the first trans-continental railroad, freight and travel shifted to an east-west route, in favor of Chicago and New York City. This was away from, and greatly to the disadvantage of Missouri River transportation and Southern cities along its course. The overland freighters of the Oregon Route were now driven out of business and stage coaches were forced to routes that supplemented the railroad. The influence of the Platte Valley in locating the Union Pacific is often overlooked and the importance of that railroad as a political and industrial factor since 1867 is

nearly always under-emphasized by geography teachers. Later, three other trans-continental railroads selected routes across the state.

Before the Union Pacific was completed many disappointed gold seekers, remembering the broad prairies of Nebraska, returned to them to make homes. Settlement now became more rapid though confined for a while to land near the Missouri River because of transportation facilities which it afforded. Settlements extended westward in valleys near water, stone, trees, and protection from winds. About the time the Union Pacific was completed settlement had reached the uplands where the soil proved much more fertile than the home-seekers had expected. The western part of the state was then a cattle country with unlimited free range.

Climate and Its Influences

The relative position and relief of Nebraska influences the climate. The climatic elements form the geographic control of first importance. The state slopes eastward from an elevation averaging about 5000 feet along the western border to less than 1000 feet at the Missouri River. The relation of this slope and its relief to climate is very definite. The mean annual temperature of the state is 48.5 degrees, being 52 degrees in the southeast and 45 degrees in the northwest, decreasing with latitude and altitude. The diurnal and annual range is quite marked, with very cold weather at times in winter, and frequent high temperature in summer. The average coldest month is January and the warmest July. Spring weather approaches from the southeast, and fall from the northwest. The average date of the last killing frost of spring is April 25th in the southeast and May 15th in the northwest. The first frost of fall comes about September 20th in the northwest and October 1st or later in the southeast. The growing season is therefore 25 to 30 days longer in the southeast counties than in the northwest. The length of growing season affects the distribution of crops, especially the corn, which, except the quick-maturing varieties, requires a long growing period. The alfalfa produces one more crop each year where the season is long than where it is short. The principal effects of altitude are indirect so far as agriculture is concerned, i. e. through temperature, as indicated above. People show direct response to elevation in their ability or failure to stand altitude of which there is a range of about 4500 feet in Nebraska.

The humidity is comparatively low in western counties but higher in the east, especially in the late spring and early summer. The mean annual rainfall is 23.8 inches, being about 33.5 inches in the southeast and 15 inches at the western border. The amount of rainfall is one of Nebraska's greatest controls. The fact that it is about half as much in the west as in the eastern part has been learned by farmers at great cost, for many of them have attempted to do, under this low rainfall, what has

been accomplished in eastern Nebraska, Iowa and Illinois. The low humidity and scant rainfall of the western counties, together with clear weather make that an inviting place for people with weak lungs.

The state's rainfall comes mostly in the growing season, June leading in amount. The snowfall is light, averaging about 20 inches annually and making sleighing uncertain. Another feature of rainfall, with an important bearing, especially in the western counties, is that the amount fluctuates between wet and dry years and periods. During wet periods, when the precipitation was temporarily above the average, crops were grown quite generally in western Nebraska by the so-called dry farming methods. During the dry periods the grazing industry thrived and farming went back, except on the drouth-resistant soils. The wet and dry periods have affected all of Nebraska and adjacent states, but most noticeably the sub-humid belts which, as a rule, are too dry for the production of crops without irrigation. With these fluctuations in rainfall in the dry country came three or four periods of settlement and abandonment, the hostilities between farmers and free rangers, the growth and shrinkage of towns, and the general ups and downs in industry.

With experience in cultivation and especially by the introduction of drouth-resistant and quick-maturing crops farmers have become more able to compete with the high dry country and its periods of low rainfall. The belief in a *permanent* increase in rainfall grew during wet periods, partly because of its advantage to land agents, but it ceased to have virtue through drouths. The fallacy of permanently increasing rainfall has been used to the detriment of western Nebraska and similar land in the great plains generally.

The central thoughts in the foregoing discussion of precipitation are, first, that the amount decreases from east to west giving opportunity for a varied vegetation and agriculture; second, that the rainfall comes in the growing season, when needed, decreasing at harvest time; third, that there is enough fluctuation betwen years and periods to keep all of the people alert and guessing, especially during the growing season.

Topographic and Soil Regions

The state varies considerably in its surface configuration, having four regions, each with distinct features of topography, drainage, soil, water supply, vegetation and industrial development. These are the Loess, Sandhill, High Plains, and Bad Land regions.

The Loess Region. This region, so named because of the prevalent surface deposit, constitutes most of the south eastern half of the state, occupying about 40,000 square miles. Its features are smooth loess plains, broad alluvial plains, hilly land, and small areas modified by bluffs and canyons. The soils are unusually fertile and easily tilled, except where the land is rough. The sub-soil is deep. The eastern part

of the region is mantled by a glacial sub-soil. It consists of three fairly distinct drift sheets: (1) bluish clay, overlaid by (2) sand and gravel, and that by (3) yellowish clay which is brownish at the surface. Boulders occur in each drift sheet but in relatively small numbers. The drift forms the hilly land of eastern Nebraska on which corn is the leading crop. The roughest of this land is devoted to grazing and tree growth.

At various places in the Loess Regions, as at York, Fairmont, Hastings, and Holdrege, the land is a smooth plain. It appears to have been formed by the accumulation of dust which was blown principally from the sandhills and the bars and beds of rivers. This deposit (loess) caps a part of the glacial area. It is deep, and forms a soil usually fertile and easily tilled. Such land is more valuable than that of glacial origin. It contains lime enough to make it sweet and in other respects is well suited for alfalfa. It grows alfalfa, wheat, corn, oats, etc., throughout, but in the middle part of the region its leading crop is wheat because: first, the smooth topography makes harvesting easy, and second, the precipitation, 20 to 25 inches annually, is right for wheat but a little light for corn. There is less farming in the western part of the Loess Region except in the valleys. This finds an explanation in the amount of rainfall and evaporation. Here the grazing industry has more relative importance than on the smooth land farther east.

We should remember, however, that fully 94% of the 20 inches of rainfall received in this and other sub-humid belts of Nebraska, soaks into the ground. It is equal, therefore to a larger precipitation where much of it runs off immediately. So the rainfall does its duty most effectively where the amount of soak-in is relatively large in proportion to the amount of run-off.

The broad alluvial plain of the Platte is a feature in the Loess Region. It has an interesting physiographic history which is too complicated to recite in this paper. In brief, it may be said that the river has partly filled its valley. It began its aggradation at a much lower level than the present plain. As the plain elevated and widened, the valley changed in depth and form, making it an open and easily traversed roadway. The up-building made the river unfit for navigation, yet it did something of importance in developing a large tract of bottom land of great value, except where it is too sandy, marshy, or alkalied.

The Loess Region is the rich agricultural district of Nebraska. It grows most of the state's corn, wheat, oats, and alfalfa on land valued at $100.00 or more per acre. It is quite thickly settled and well improved, having good wagon roads, numerous towns, and railroads.

SANDHILL REGION. The Sandhill Region, in the north central counties, has an area of about 20,000 square miles. It is mostly a region of dunesand, shaped by wind which acted upon loose Tertiary and alluvial

deposits. Here dunes, ridges, basins, and valleys are the prevailing land forms. There are few rivers, but several groups of small lakes. Drainage is principally underground, coming to the streams through springs. The soil is weak, except on the firm land of the larger valleys. It supports a thin growth of hard stemmed grasses and low shrubs. These form the basis of the leading industry, cattle grazing. It requires several acres of land to pasture a single animal, making the ranches large, usually with thousands of acres each. Stock yards are the most noticeable thing in the small railroad towns. The agricultural land is in isolated places, cut off from market by heavy roads leading across the dune-sands. The Sandhill Region is sparsely settled. Just what the development here may be in the future is not known. It remains a problem, for the region has both favorable and unfavorable conditions. It is very evident that the lack of development in this region is due to the quality of soil and not to the quantity of precipitation. An attempt is being made to forest the dunes with pines. Much of the land has been filed upon by Kincaid homesteaders in 640 acre tracts.

THE HIGH PLAINS REGION. The western part of Nebraska is very diverse. It has several small provinces known collectively as the High Plains Region. The principal topographic features are tablelands, buttes, and canyons. The region is capped by Tertiary deposits—clayey below and sandy to pebbly above. The original surface is in process of destruction by rivers and wind. The North Platte eroded a large valley several miles wide, but is now aggrading its bed at a depth of about 600 to 800 feet below the bordering high plains. Between these upland and bottom-land plains are steep valley slopes in process of dissection.

The smooth uplands present a broad open view floored with a carpet of buffalo and gramma grasses. They are a part of the short grass country. The water supply, though deep, is of especially good quality. The soils, varying from fine to coarse in texture, produce grazing, but are not, as a rule, sufficiently drouth-resistant for farming. Small areas, where the soil is close textured and deep, grow good crops. This shows that the amount of rainfall is not a sure control. Soil type is equally important, for here one sees success and failure in agriculture side by side, and the only apparent difference is in soil texture.

Most of the steep valley-sides are bare. In some places they support thin stands of pines and cedars. The more gradual slopes grow bunch grass, prairie grass, blue stem, and sage brush, in formations quite unlike those of the table lands. This is given over nearly exclusively to grazing. The alluvial and other smooth lands along the valleys produce crops of native hay. Much of the bottom and bench land, especially along the North Platte, is farmed under successful irrigation. These irrigated zones of the valleys, with their thick settlements and towns are a distinct contrast to the retarded cultural development of the other zones of this

region. The farming area is being extended by the use of impounded flood water.

BAD-LANDS. In the north western part of the state is a small bad-land area at the edge of a large region in South Dakota and Wyoming. It was formed principally by river erosion of the High Plains in which thick surface beds of sand and gravel were removed from above clayey formations, after which the latter were carved into typical bad-lands. It is nearly bare because of rapid erosion, and supports only a scanty growth of vegetation. The water supply here is bad and few people occupy the land, which is used mostly for grazing.

RAILROADS

Railroads were built in Nebraska for two leading purposes: first, to reach points beyond its borders, as in California, Colorado and the Black Hills, and second, for local service.

The Union Pacific followed the Platte and Lodgepole valleys to near Cheyenne, beyond which is a low divide across the Rockies. Later, it extended a line up the South Platte to Denver and another up the North Platte to Bridgeport. The Burlington between Omaha, Lincoln and Denver followed Salt Creek, then up one small valley and down another to the Big Blue, beyond which it kept the divide to near Oxford. Here it entered the Republican valley, following its bench land and the smooth high plains to Denver. The Black Hills branch of the Burlington built from Lincoln along Oak Creek, across the Blue, and over the smooth Loess plains and broad Platte bottom, striking the Middle Loup north of Grand Island. The route in the Sandhills is through the Loup and other valleys. The North Western line to the Black Hills occupies the Elkhorn valley. The natural route between St. Joseph and Lincoln is along the Missouri, Big Nemaha and Salt Creek valleys. This is occupied by the Burlington which connected also between Table Rock and Oxford, following tributaries of the Nemaha and Blue River valleys most of the way to the Republican.

A very noticeable feature in the distribution of railroads in Nebraska is the absence of continuous lines along the right bank of the Missouri. This is not because they are not needed, but on account of cut-banks and bluffs which force the railroads to the Iowa and Missouri side where the river plain is continuous. The river cuts its right bank harder than the left.

CITIES AND TOWNS

With few exceptions Nebraska's permanent towns were located along railroads. The location of county seats, state institutions, and railroad division points have operated to the advantage of many places. There are evidences of control, however, for the railroads have followed natural routes and thereby have determined in a general way the positions of towns. A town has sprung up wherever a railroad crossed a large val-

ley. The Platte valley cities are at or near the mouths of tributary valleys. This same control is observed in the Loup system, where towns grew up on railroads at the junction of tributary and trunk valleys.

Platsmouth, though well named, is not the industrial gateway to the Platte. Omaha is directly in line with that, and from the standpoint of commerce, is the key to Nebraska, being only a few miles from the straight courses of the Platte and Salt Creek valleys. Omaha is at the crossing of water and land routes.

Lincoln was so located partly because of saline springs, but more on account of the unusual arrangement of valleys which permit the entry of wagon roads and railroads from all directions by easy grades. *Except a few places in the High Plains Region, Nebraska cities are confined to the fertile Loess Region.* The Sandhills and Bad-lands have few towns, all small.

Omaha, South Omaha and Lincoln are the principal industrial centers. The industry of Nebraska cities is based on agricultural resources and geographic position.

Reclamation and Conservation

The state's greatest resource is soil of several classes. Consequently much attention is given its cultivation. This means proper development or conservation. The wet, dry, sandy, alkali, and rough lands are problems in reclamation. In consequence of this, much is said and done along the lines of drainage, dry farming, irrigation, and forestation.

The high priced agricultural lands require careful management to insure the maintenance of their productive capacity. In consequence of this, emphasis is placed upon seed selection, cultivation, crop rotation, etc. The importance of Nebraska's rich soils may be realized when it is known that the agricultural products coming therefrom have an annual value of more than $300,000,000. It is only natural for the people to show an unusual interest in matters which pertain to their industrial life. This is plainly reflected in the educational development in which state geography, domestic science, and agriculture have considerable prominence in the common schools. In the experiment stations and agricultural college of the university more than usual attention is given to problems which confront rural people.

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CLIMATE AS RELATED TO INDUSTRY AND COMMERCE*

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TEMPERATURE

THE annual recurrence of spring and winter, in regions outside of the tropics, with the resulting resurrection and death of many forms of plant life, is our most familiar and striking illustration of the relation between vegetation and temperature. To see Nature's carpet of white give place to one of softest green; to see the bare, gray branches of the forest trees gradually hidden by luxuriant foliage; to see fruit trees glorifying the landscape with their wealth of pink and white blossoms; to see fields of grain turning golden in the summer sunshine, ripening their seed, and thus perpetuating their kind, is to witness a truly wonderful transformation.

We may observe a similar relation between plants and temperature by making an extended journey along a meridian. In equatorial regions near sea level we are surrounded by palms, banana trees, and other characteristic tropical vegetation. As we journey poleward these forms gradually give place to deciduous trees and the more hardy plants of the temperate zone. As higher latitudes are reached, deciduous forests are replaced by coniferous, and in time the poleward limits of grain and trees are reached. Still nearer the poles are areas where only the most hardy forms of plant life can exist, while beyond stretch the realms of everlasting snow.

There is also an altitudinal variation in temperature, there being an average decrease of about one degree Fahrenheit for every 339 feet of ascent, and a consequent variation in plant life. In Mexico orange, lemon, palm, and banana trees, coffee, cotton, sugar-cane and rice are grown within a comparatively short distance of mountains permanently snow covered. In ascending these, and other mountains similarly situated, the traveler passes through all climatic and vegetation zones from tropical to boreal.

The distribution of animal life is, in large measure, governed by temperature, but as most animals are more highly developed than are plants, and as nearly all have the power of locomotion, the control is less marked. Many animals live where high temperatures prevail. Animals living in regions subject to winter conditions meet these conditions by putting on a heavier coat, by burrowing, by hibernating, by constructing shelters, by storing up food or by migrating.

Man, the most highly developed form of life, is also profoundly influenced by temperature conditions. He depends upon plants and ani-

*From a volume being prepared by the author.

mals for food, for clothing, and to a certain extent for shelter and transportation. In earlier ages, therefore, man could not live far from the forms of life upon which he depended, but with the development of the human race have come the marvelous inventions which have made it possible for mankind to live far from the sources of the raw materials which furnish the necessities of life.

Temperature exerts a powerful control over the progress of a people. No great nation has developed within the humid lands of the torrid zone, nor the frozen wastes of the arctic regions. In the one, there is no non-productive season for which provision must be made. Nature is so lavish that there is little incentive to, or need for, labor. Furthermore an atmosphere high in temperature, and reeking with moisture deprives man of energy and ambition. In the other, Nature imposes such hard conditions upon her children that living is reduced to mere existence.

Since, therefore, man's industry, as well as his articles of exchange and commerce, are so inseparably connected with the plant and animal life of the globe, temperature exerts a strong control over industry and commerce in their various forms. There are regions and peoples occupying very important places in the industrial and commercial life of the world, and there are others whose contributions are very limited.

In the northern part of both North America and Eurasia are areas where the summer temperature rises above 32° Fahrenheit for a short time only. Here the ground, below the depth of two or three feet, remains permanently frozen. The growing of crops is prohibited by the short summers and even trees are absent. The only form of vegetation that thrives is the reindeer moss.

As animals depend upon plants or other animals for food, these regions have a limited fauna as well as flora. Here then there are no farms, no forests, no mines, no railroads, no cities, in a word none of the conditions essential to the development of industry and commerce. The unfortunate inhabitants, few in numbers, wage a never-ceasing warfare with Nature, and as a result secure the means of a bare existence.

The distribution of the cotton plant well illustrates the relation of temperature to industry. Cotton requires a moderate amount of rainfall, a relatively high temperature, and a long growing season. These conditions are not met in many large areas. The latitudinal and altitudinal extension of the plant is practically limited by the annual isotherm of 60°F. In the United States this is south of the parallel of 37° and, with the exception of the Imperial Valley and other small sections, east of the one hundredth meridian. In this area there are about seven months between the latest killing frost in spring and the earliest killing frost in autumn. The large area in which these conditions exist makes it possible for the United States to produce about three-fourths of the cotton of the world.

How different would have been the history of the United States had not the South been adapted to the growing of this plant. The influence of temperature upon history, as well as the industrial and commercial phases of life is well brought out by the following: "History shows us that it was only narrowly that the states of Illinois and Indiana escaped the institution of slave-owning within their territories. If the isotherms had been drawn one or two hundred miles farther north. so that the southern crops could have prospered in these states, the evil of slavery might well have been fastened so firmly that it could not have been uprooted from our country." Shaler, *Nature and Man in America,* p. 211. In Colonial days the rapid development of our commerce was in very large measure due to the raising of this crop. Galveston, New Orleans, Birmingham, Savannah, Columbia, and many other southern cities owe much to cotton, while railroad and steamship lines are furnished a large amount of business in transporting the raw product.

Corn requires for its successful cultivation a higher temperature than does wheat. The corn belt in our country is therefore found south of the wheat belt. The industries of hog raising and pork packing are very closely related to that of corn growing. Hence we find hog raising to be an important industry in the corn belt, and here are found also the great pork packing centers—Chicago, St. Louis, Kansas City and Omaha.

The date of the first killing frost is very important as applied to the corn crop. For example the first killing frost may occur two weeks or even a month earlier than the average time of the same event.. This would usually mean a tremendous loss in the case of crops not matured. At Davenport, Iowa, the average date of the first killing frost is October 12th, while the earliest recorded date of the same is September 18th. At Keokuk, Iowa, the average date is October 22nd; the earliest recorded date is September 18th. At Lincoln, Nebraska, the average date is October 8th, while the earliest recorded date is September 12th. The industry of corn growing, so important in the United States, is entirely absent in Great Britain because the summer temperature is not sufficiently high. As a result, comparatively few hogs are raised in the British Isles and most of the pork consumed there must be imported.

Favorable temperature conditions make possible the extensive growing of the mulberry tree in the valley of the Rhone. Hence silk worms are raised in great numbers in south-eastern France and as coal is close at hand, the manufacture of silk cloth and ribbons is highly developed. The city of Lyons owes its importance in some measure to the silk industry.

Citrus fruits cannot be grown in regions where the temperature falls much below the freezing point. The area well adapted to the growing of these fruits is, therefore, very limtied. Florida is subject to cold waves because a great body of land lies to the windward. The land, through

rapid radiation of heat, develops a low winter temperature. The eastward moving atmosphere is therefore chilled. As a result one of the great industries of the state, the growing of these fruits, has suffered severely. In 1894 and 1895, according to the official records at Jacksonville, Florida, a temperature as low as 14° F. occurred, while in 1899 the mercury fell to 10° F.

Southern California, although farther north than Florida, does not suffer from the cold waves because a great ocean, subject to very slight temperature range, lies to the windward. As a consequence, California produces the bulk of the oranges and lemons grown in the United States, and thousands of cars are required annually for the shipment of the fruit to eastern points.

Temperature exerts a marked control over the commerce of Russia because her southern and western ports are blocked by ice for several months each year. Even Vladivostok requires the services of an ice breaker for a short time each winter.

The commerce of the German Empire is temporarily checked each year because of low winter temperatures. Navigation is interfered with on the upper Elbe and Oder for about eighty days. The port of Stettin is ice bound for sixty-one days yearly, Lubeck for thirty-two days, Tilsit one hundred thirty-four days and Memel one hundred forty-two days.

In Alaska modes of transportation are completely changed with the change from summer to winter. During the summer the Yukon is a great highway of commerce, but during the winter this, and all other streams, are closed by ice and all commerce and travel are by sleds drawn by dogs or reindeer, or on foot. The opening of the rivers is an event of great importance to the people who for so many months have been shut in from the outer world.

The commercial importance of the St. Lawrence and the Great Lakes is greatly decreased by the same cause. The Great Lakes are open to commerce for about eight months yearly. The amount of wheat, lumber, iron and copper shipped east, and coal shipped west is enormous. On the average four vessels per hour pass Detroit during the open season. This gives some idea of the loss which results from inability to use this great natural highway for four months of each year. During the winter considerable of Canada's commerce is diverted from the St. Lawrence to Portland, Maine, and Halifax, Nova Scotia, because these ports are never closed by ice.

Rainfall

The distribution of rainfall, both as to amount and time, exercises an important control over products and industries. In general it may be said that the annual amount of precipitation necessary for successful agriculture without irrigation is twenty inches. Lying west of the one hundredth meridian, and east of the Rocky Mountains is a vast area

where the average annual precipitation is less than twenty inches. In most of the Great Basin it amounts to less than ten inches annually.

In these areas, therefore, with the exception of such portions as are now, or can in the future be placed under irrigation—a small part of the whole—agriculture can never be highly developed. Broadly speaking neither manufacturing nor commerce will ever assume large proportions in "the land of little rain." There are very extensive areas in Asia, Africa and Australia which, owing to lack of moisture, must always remain practically uninhabited, and therefore not commercial regions.

In order that agriculture without irrigation may be profitably carried on, the precipitation should be advantageously distributed as to time. In a large part of the United States east of the one hundredth meridian, the precipitation, which averages thirty to forty inches annually, is usually sufficient during the summer season. This is a matter of great importance to the growing crops. In Iowa fifty-one per cent of the total annual precipitation occurs between May first and September first. The occasional occurrence of a long continued summer drought results in a serious shortage in corn, wheat, oats, and other crops. This was well illustrated by the droughts which occurred in Iowa and Nebraska in 1894 and 1901. In both years the corn crop suffered greatly. A timely rain occurring in Kansas and Nebraska in 1900, and continuing for twenty-four hours, increased the value of the corn crop by $80,000,000.

In California the distribution of rainfall, while very different from that in the middle and eastern sections of our country is, at the same time, advantageous in the highest degree to certain well developed industries. Fruit drying, which is carried on during the summer months, and the raisin and bean industries which occur in the autumn, would be very seriously interfered with by rains during those seasons. The harvesting of wheat is greatly facilitated by the dry summers, as the grain is not lodged by storms, and the sacks of wheat can be left in the fields for weeks without danger.. During the summer and most of the autumn, the state is practically without precipitation, most of it being received between December first and April first.

A deficiency of rainfall in regions where irrigation can be practiced has other economic and social advantages. Crops are much more certain than they are in areas where rainfall is depended upon, and several crops are usually raised each year. Holdings are generally smaller than in non-irrigated regions, and cooperation is resorted to in the development and distribution of water. Thus the rural population is more dense than it would otherwise be. Towns spring up. In response to demand, manufacturing develops, and transportation facilities and social advantages come rapidly.. The great Imperial Valley, as well as Southern California in general, and the irrigated portions of all of our western states, are excellent illustrations. .

In regions where rainfall is limited to one season, and irrigation is not practiced, people are sometimes, as a direct consequence, nomadic. Flocks and herds must be driven from place to place in order to secure the necessary pasturage. Under such conditions permanent settlements, industries, commerce, and social stability are lacking. Arabia furnishes a good illustration of this.

India, a land of seasonal rainfall, depends almost wholly upon the southwest monsoon. This moisture bearing wind striking against the Western Ghats and, in its further progress against the lofty Himalayas, deposits an abundance of moisture upon their windward slopes.

"The monsoon is the yearly salvation of the millions that live on the fruits of the soil. A good or a bad monsoon is the criterion of plenty or of famine. By it India lives; without it there is starvation, death, and misery. The anxiety, therefore, with which all, from highest to lowest, look out for the first warning telegrams from the Seychelles or Mauritius of these indications which are the forerunners of the yearly rain-supply may well be imagined." Holdrich, *India,* p. 348.

Floods often seriously affect industry and commerce. Floods may result from unusually heavy rains, or from melting snow, or both. A "warm spell" may cause the snow to melt when the ground is not sufficiently thawed to absorb much water. In 1903 floods in the Mississippi valley did great damage to railroad and other property. On January 1, 1910, a washout put a stop to all through traffic on the Salt Lake Railroad. Business was not resumed until June 11, 1910. The loss amounted to millions of dollars.

The Winds

In the past the winds exercised a strong influence upon commerce. The progress of sailing vessels has always been and is today more or less determined by the direction, constancy and velocity of the wind. Vessels of this class require a little longer time in making the voyage from western Europe to America, than on the return trip.

Had Columbus sailed westward from France, Germany or England his voyage of discovery might have been a failure for he would have had the westerly winds with which to contend. Sailing southward to the twenty-eighth parallel, which according to Toscanelli's map passed through Cipango or Japan, and then directly west, he was helped onward by the trades. Thus the discovery of America, and the portion of it settled by the Spaniards, was in a measure due to the winds.

It is then apparent that the life of man, and the industrial and commercial development of the world, are profoundly influenced by climate. As man develops, unfavorable climatic environment is, in a measure, overcome. But while this is true, so long as human beings require food, clothing and shelter, just so long will climate exercise a powerful control over mankind.

IMPROVEMENT IN GEOGRAPHY TEACHING

W. J. SUTHERLAND

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OF all the suggestive lines of improvement in geography teaching, there are two that are definite, highly fruitful, and immediately applicable by ambitious teachers. They are:

(1) *a careful and judicious selection of subject-matter units and*

(2) *a wiser use of the text book both by teacher and pupils.*

Since the content of geography is so great and so varied, the selection of units that are pertinent and educative for a given class of pupils, is a highly important factor in good teaching. Such a selection is dependent upon

(1) the absolute needs of the individual members of the class and

(2) the general course of study into which the geography lessons must function.

The writer believes that there is no greater source of waste in teaching than that which results from unconsidered and unjustifiable assignments. Text books are so often used uncritically with relation to their contents. Teachers often seem to assume that all materials found in a book are essential to all pupils, and hence there is no discrimination in the assignments. Texts in geography partake of the nature of gazetteers and should be used accordingly. Like other books, some parts of geographical texts "are to be read only in parts; others to be read but not curiously; and some few to be read wholly, and with diligence and attention."

In the most practical way—assuming equality of educative value—the topics which are best treated in the text, should be selected for thorough study. Mere reference *to* topics stimulates little interest and is therefore of little worth. Unless the teacher is so excellently prepared that he can elaborate and complement many of the briefly treated topics of geographical texts, there can be little gained through their assignment.

With reference to the use of geographical texts, it has already been implied that an unwise use too often attends the making of assignments. Every good assignment presupposes the recognition of desired ends. Too often, however, teachers are unconscious of definite motives, in which case the conventional "take the next page" cannot properly be called an assignment.

Geographical texts can be used to good advantage in

1. The solution of problems.
2. The verifying of inferences.
3. The gathering of data from which principles may be deduced.

One of the very best uses of the geographical text, and, incidentally, one that aids in teaching how to study, is that made necessary through

the solution of problems. Suppose the problem be, Why is the winter temperature of Seattle so high? or, What conditions have effected the rapid growth of Chicago? or, What water body furnishes the larger portion of moisture to the Corn Belt?

The solution of such problems necessitates a purposeful use of the book; it requires the pupil to select from the context pertinent statements; it leads him to make intelligent use of graphs and maps. Suppose Problem 1 is before the pupil. He should determine—

1. The geographical location of Seattle.
2. Its position with relation to large water bodies and mountain ranges.
3. Its altitude.
4. The direction of the prevailing winter winds.
5. The frequency of cyclonic storms and the winter rainfall, etc.

Having secured the data called for in these questions, and having weighed the probable effect of each on winter temperature, it becomes the function of the teacher to develop the idea that the high winter temperature of Seattle is due (1) to the mild winds that blow from the Pacific Ocean, and (2) to the heat that comes from the rapid condensation of moisture.

The second wise use of the text is necessitated of pupils in verifying inferences. The exercise is a deductive process. After solving the problem relative to Seattle's high winter temperature, the problem might be, Why is the winter temperature of the British Isles relatively high? The inference would be that the warm winds from the Atlantic and the heat that comes from rapid condensation of moisture controls the winter temperature of this region.

To verify the inference the pupils would be requested to read their texts with the definite aim of determining:

1. The prevailing winter winds in the British Isles.
2. The frequency of cyclonic storms and the winter rainfall.
3. The location of mountains, highlands, etc.

If the data here secured were quite comparable to that secured for Seattle, the pupils may well conclude that their inference was correct. Often, however, definite statements can be found in the text to prove the truthfulness of inferences.

The third wise use of the geographical text is that of securing data from which to generalize. This is an inductive procedure. Suppose the problem be, What relation do the forests of the United States bear to the precipitation of moisture? Here the text statements and map-readings are carefully collected as,

Puget Sound Basin: Annual rainfall 60-100 inches; heavy forests of coniferous trees.

Great Basin: Annual rainfall 6-10 inches; no forests.

When the various regions have been thus examined, the conclusion may be reached, and the general principle formulated.

A wise use of a geographical text in itself alone necessitates good teaching.

In general it may be said that the selection of larger and more pertinent units is fundamental to better results. Units should be larger. Regions should be studied rather than parts of regions in the form of political divisions. Material irrelevant to the life of today should be eliminated. This done, the lesson assignment should assume the form of a problem for solution, an inference to verify, or a principle to develop.

THE WORLD'S GREAT RIVERS

THE YANG-TZE-KIANG

By ELIOT BLACKWELDER

University of Wisconsin, Madison

Almost as long as the Mississippi, as easily navigated as the Amazon and yet flowing through a land more populous than Europe, the Yang-tze river of China is second to none in importance to the human race. Its ultimate sources are among the snowy ranges of Tibet, in a region still but little known. The river assumes prominence as it enters the basin of Sze-chuan, the extreme western province of the empire.

Sze-chuan, one of the richest provinces in China, is completely isolated from the outer world by belts of rugged mountains. Within these barriers lies a fertile lowland from which an intelligent population produces some of China's most valued articles of commerce, such as silk, wax, laquer, and grain. For the export of this produce there is now only one avenue of any importance, the Yang-tze river. River navigation is usually an easy matter, and in China it has been brought to great efficiency; but in the exit from the western basin the difficulties which beset the traffic are enormous. After leaving the garden of Sze-chuan, the great river passes through a series of gorges of unsurpassed grandeur. Instead of a smooth avenue of commerce it becomes a powerful and dangerous flood, full of whirlpools and rapids. On both sides it is shut in by cliffs 3000—4000 feet in height. Where the cliffs recede a little, there are towns in the open spaces,—the people all engaged in the river trade.

The Yang-tze carries every year an enormous burden of commerce between eastern and western China. Travel down stream is rapid and easy, although dangerous here and there where hidden rocks and rapids have to be passed. On the return journey junks of all sizes are laboriously dragged up the stream by thousands of coolies tugging at bamboo ropes. The trip requires several weeks. A railroad from Hankow, often

called "the Chicago of China," to this rich western province would be an expensive undertaking, and would require a high order of engineering skill to build it, but it would pay handsomely. The thirty millions of industrious people of Sze-chuan and its mountain dependencies would create a traffic of stupendous proportions.

From the gorges to the sea the great river traverses the densely populated central provinces, here hilly and there flat. It passes by the cities of Hankow, Nanking, Shanghai and many others almost as large. Its deep channel permits big ocean freight steamers to ascend 600 miles to Hankow for cargoes of tea, and steamers larger than many of the passenger vessels on our own Great Lakes go up to the mouth of the gorges, 1100 miles back from the sea, while the number of native junks that ply its water runs far into the thousands.

NEW YORK STATE SYLLABUS IN GEOGRAPHY

Fourth Year

North America, the United States and the remaining continents in outline

When the children enter upon the work of this year, they already know about the world as a whole, its continents and great oceans; and it seems natural, therefore, that the year's work should begin with a more detailed study of some one of the continents. This will, of course, be the one in which they live.

For this work the children should have a textbook, their lessons should be assigned from the textbook, and they should be held to a careful preparation of these lessons. The textbook should be descriptive in character, and the use of the same sort of text should be continued until the first study of the several continents and countries of the world has been completed. In later years the textbook should be of an entirely different character.

The elementary textbook in geography is usually the first book placed in the hands of the children which they are expected to study for the purpose of obtaining information, and for that reason it is extremely important that its use should be carefully taught.. This is best done by discussing each day in class the lesson for the next day, and at the close of the oral work, assigning the same lesson for study. Later the children should be called upon to recite upon the text. After a little it will be sufficient to point out during the assignment of the lesson the items of greatest importance, adding thereto "search questions," the answers to which may be found in the text. While this makes the teacher's work more difficult at first, it pays in the end because of the added clearness and interest.

North America

I Position

1 In zones
2 In hemispheres
3 In relation to bordering waters
4 In relation to other continents

II Form

Actual, determined by

a Its more important indentations
(1) Hudson bay
(2) Baffin bay
(3) Davis strait
(4) Gulf of St. Lawrence
(5) Gulf of Mexico
(6) Caribbean sea
(7) Gulf of California
(8) Bering sea
(9) Bering strait

b Its important prolongations
(1) Nova Scotia
(2) Florida
(3) Yucatan
(4) Lower California

c Chief islands adjacent
(1) Many unnamed islands at the north
(2) Greenland
(3) Newfoundland
(4) The West Indies
(5) Many islands along the western coast, of which Vancouver and the Aleutian are the most important

These islands will not be thought to have much to do with the "form" of the continent unless the existence of a partially submerged continental shelf is explained in some simple way.

III Size

1 As compared with other continents. This should be done in a rough way only. No area in square miles is to be given.
2 As shown by the fact that it stretches entirely across the north temperate zone and reaches into the frigid on the north and the torrid on the south.

IV Relief

1 Highlands: *a* Rocky mountain highlands; *b* Appalachian highlands
2 Lowlands: *a* Plains—really long and gentle slopes made up of a complex of much smaller slopes. There is, however, no need of pointing out their complexity at this time.
(1) The great central plain; (2) The Atlantic coast plain; (3) The Gulf coast plain.

V Drainage

1 Gulf drainage; 2 Atlantic drainage; 3 Pacific drainage.

VI Distribution of population

This should be an extremely simple division into dense, less dense, and sparsely settled districts as determined by the occupations of the people.

VII Political divisions

1 United States and Alaska; 2 Dominion of Canada; 3 Mexico; 4 Central America.

The order of topics used in the study of North America is followed in this study of the United States. Some of these require little or no amplification and are in the nature of review, while others, as, IV Relief, VI Climate, and VII Possibilities of occupation, are to be treated with greater fullness because of their greater importance. The teacher should keep constantly in mind that it is the large general truths of relief, climate, natural resources and industry which are wanted, not isolated evidences of geographical relationships, however interesting.

I Position

1 In the continent
2 In relation to the bordering water bodies
3 In relation to other countries with which trade is carried on

II Form, as determined by the

1 Chief indentations
- *a* New York bay
- *b* Delaware bay
- *c* Chesapeake bay
- *d* Mobile bay
- *e* Galveston bay
- f San Francisco bay

2 Chief prolongations
- *a* Cape Cod
- *b* Cape May
- *c* Cape Hatteras
- *d* Cape Fear
- *e* Cape Canaveral
- *f* Cape Sable
- *g* Cape Mendocino
- *h* Cape Flattery

III Size

Shown by the length of time that it takes to journey across it from east to west and from north to south.

IV Relief

1 This includes a study of the differences in character, elevation and extent between the two great highland masses. In this connection the chief ranges should also be named, located and characterized.

2 Notice the main slopes, the great plains which they form, and the character and use of these plains.

V Drainage

Study the chief drainage lines and their relation to the relief forms. Compare some of the larger streams as to size and commercial importance. The children should be able to locate and characterize the Mississippi system, the St. Lawrence-Great Lake system, the other important streams of the Atlantic drainage, the Columbia-Snake, the Sacramento-San Joaquin,

and the Colorado river of the west. Drill most persistently upon the streams which are commercially important.

VI Climate

Show the position of the United States on the globe. Point out that the northern part is near the arctic zone. Locate the home state and the city or village nearest to the school. The children may be asked to describe the usual weather conditions during the summer and winter in their own home region. Show pictures of southern scenes, and have the children tell how the northern and southern seasons differ. If the children are not already familiar with these processes, through their nature study, give some simple lessons on evaporation and condensation of moisture. Explain how moisture, evaporated over the surface of the sea, is borne into the interior to be condensed and fall as rain over the land.

Show upon maps the distribution of rainfall in the United States. Have children locate on wall maps regions of:

1 Abundant rainfall
   a Where the rain is well distributed and where the temperature is warm enough to produce abundant vegetation, and
   b Where the rain is abundant in amount and in a warm region, but not well distributed, resulting in arid or semiarid wastes, and
   c Where the rain is abundant in amount but in cold regions, resulting in snow
2 Medium rainfall—enough so that crops will grow
3 Slight or no rainfall—resulting in deserts

VII Possibilities of occupation

As a result of the relief, temperature and rainfall, it will be found that certain parts of the United States are suited to certain industries; i. e., they furnish certain possibilities of occupation. These regions are so sharply differentiated that it is possible to divide the states into groups in which substantially the same industries are carried on. In this way we find:

1 The chief agricultural and grazing sections and their chief productions
2 The mining regions and the most important minerals
3 The lumbering regions and the most important trees
4 The manufacturing regions and manufactures
5 The fishing grounds and the chief catches

VIII States

Give the children an idea of what is meant by a state, recall to

their minds the nature of a political boundary line, point out physical regions and state groups, and have them identify these groups by their leading industries.

Only a few of the leading industrial and commercial cities should be studied, and they should be closely identified with the industrial region in which they are located and with their leading productions. Alaska should be considered with the United States.

The remaining countries of North America should be learned by name, and their relation to the general continental structure, drainage and climate briefly pointed out. The work thus far outlined will occupy the first half of the year. The second half should be devoted to a very rapid survey of the other continents with but little reference to individual countries except in the case of Europe. There the leading countries are to be located and characterized.

The text in the fourth year should be descriptive in character. Only the more important physical and political features need receive emphasis.

Many items of information ordinarily included in geographical textbooks must be rigorously excluded. Items of history and government have no place here.

Be simple, confine the children to the study of geography and do not go into details.

SPEAKING OF JAPAN

Did you know,—

1. That the islands are the high portions of a partially submerged and growing mountain range rising from the deep sea?
2. That there are more than 50 active volcanoes in the islands and that earthquakes are of almost daily occurrence in some part?
3. That the steepness of the mountains gives such velocity to the streams that it is almost impossible to preserve good roads and that wheeled vehicles are comparatively rare except in and near towns?
4. That less than 30 per cent. of the surface is productive and about 16 per cent. is actually devoted to agriculture?
5. That it has an area equal to California and a population greater than all South America?
6. That the northern islands are farther north than any of our states and the southernmost are in the torrid zone?

7. That the empire proper consists of three good sized islands, while nearly 500 other small ones and Korea are under Japanese authority?
8. That the dense population and small area of productive land almost excludes the keeping of live stock?
9. That Japan has coal mines of great value, and with the industrial genius of the people, may look forward, and does look forward, to being the England of the East in manufacturing?
10. That Japan has a lake 36 miles long and 12 miles wide?
11. That the Japanese differ widely from other Orientals in their love of cleanliness, their politeness, their artistic instinct and their appreciation of natural beauty?
12. That the Japanese are one of the great fishing nations of the world? (4th in rank).
13. That thousands of tons of fish are caught to be used as fertilizer around the roots of the tea plants?
14. That the Japanese export a large part of the excellent rice which they produce and import a cheaper grade for their own use?
15. That most of the world's supply of camphor comes from the island of Formosa?
16. That raw and some manufactured silk form nearly half of the value of the exports, being six to eight times the value of tea exports?
17. That Japan is not a great tea producer? The annual yield is only 1½ pounds per capita of the population, while that of Ceylon is 45 pounds per capita.
18. That the production of silk in Japan or elsewhere is not so much a matter of climate as of cheap labor?
19. That the Japanese are developing cotton manufacturing with phenomenal rapidity?

CONTEMPORARY GEOGRAPHY FROM THE NEWSPAPERS

(On this page we purpose to publish for a time a review of selected geographical items from the daily papers with suggestive questions such as teachers might use in the schools, *always in connection with the best available maps*, to call the attention of students to the live quality in geography. This should stimulate interest and make students think for themselves in connection with finding out personally how the happenings recorded in the press today become the standard illustrations of the geographical text-books of tomorrow.)

VOLCANOES.—During the early part of September, the Bogoslof volcanoes in Bering Sea, 30 miles north of the Aleutian Islands near latitude 54° N. and longitude 168° W., resumed activity, building up a new cone on the site of a series of earlier small volcanoes which have been

renewed and destroyed repeatedly since 1786. *Suggestions.* Locate Bogoslof approximately on a map. Are new volcanoes being formed in many parts of the world today, or is volcanic activity confined to the past?

VOYAGES THROUGH THE AIR.—On Oct. 16th, Walter Wellman attempted to cross the Atlantic Ocean in a dirigible balloon. He started from Atlantic City, travelled some distance east of Nantucket Island, and finally abandoned his airship 150 miles east of Cape Hatteras, after travelling about 850 to 1000 miles. On Oct. 17th Hawley and Post travelled in a balloon from St. Louis to a point in Canada about 150 miles north of Quebec, a total distance of 1350 miles. *Suggestions.* Locate Atlantic City and the two points reached in the ocean, also St. Louis and Quebec. In these two journeys through the air, was the route related to the prevailing winds of eastern America? Were the two places of landing in thickly populated or frequently traversed parts of the land and the ocean respectively?

HIGHEST MOUNTAIN IN NORTH AMERICA.—It is reported that a new peak has been discovered in Alaska near latitude 67° N. and longitude 141° W. and that it is two thousand feet higher than Mt. McKinley. *Suggestions.* This is merely a rumor at present, not an established fact. Locate this position approximately. If it is east of 141° would it be in Alaska or Canada? How high would this new mountain be? Where and about how high are Mt. McKinley, Mt. St. Elias, and Mt. Whitney?

GROWTH OF CITIES.—The populations of New York City, Chicago, Philadelphia, Boston, and St. Louis in 1910 are announced; New York has grown over twice as fast in the last ten years as Chicago and nearly twelve times as fast as St. Louis. *Suggestions.* Look at a map showing all these cities and the smaller cities near each and suggest reasons that might account for the difference in the rate of growth. Do you think the rates of increase of population will be similar during the next ten years?

POPULATIONS OF STATES.—Iowa decreased in population by 7000 between 1900 and 1910, though its population had increased nearly 320,000 during the previous ten years. Missouri increased 6 per cent, Michigan 16 per cent, and Massachusetts 20 per cent. *Suggestions.* Manufacturing is very important in Massachusetts and is increasing in Michigan, while Missouri and Iowa are farming states. Iowa has the largest proportion of improved land of any state. The tendency is toward larger farms in Iowa and there are cheaper lands west of Iowa in the United States and Canada. In Massachusetts smaller and smaller farms are the rule, but agriculture has less to do with the increase of population than manufacturing. Are manufacturing or agricultural regions usually more thickly populated? Has New England or the Mississippi valley been settled longer?

L. M.

PREDOMINENCE OF MANUFACTURES IN OUR EXPORTS

The value of manufactured goods exported from the United States now averages a little more than 2½ million dollars for each business day: ten years ago the daily average was a trifle over 1½ million. This striking development, together with the fact that manufactures now, for the first time in the history of the country, form over one-half of the total exports, is the excuse for again referring to the changing character of the export trade of the United States.

Manufactures, whether ready for consumption or for further use in manufacturing, showed a larger value in the fiscal year ending with June 30, 1910, than in any preceding year in the history of export trade. Foodstuffs, whether considered as a whole or by single articles, showed a distinct and, in many cases, a sharp decline in 1910 compared with earlier years. Looking at the export trade of the United States as a whole, the decreases in recent years have occurred almost exclusively in foodstuffs and other natural products, and the increases have been almost entirely in manufactures.

Ten years ago manufactures formed 35.4 per cent of the total exports from the United States; this proportion gradually rose to 44.9 per cent in the fiscal year 1910. Bringing these figures up to a more recent date, by taking the last six months of the fiscal year 1910, that is January to June, inclusive, and the first two months of the fiscal year 1911, that is July and August, we find that for these eight months the exports of manufactures constituted 52.8 per cent. of the total exports, which, as already stated, is a figure never before attained in the exports of the country. A most significant feature of this growth is that finished manufactures are making greater advances than partly manufactured goods for further use in manufacturing. In striking contrast with the increase in manufactures is the diminution in foodstuffs. For the eight months from January to August, inclusive, foodstuffs formed but 20.5 per cent of the total exports, as compared with 26 per cent in 1908.

It is notable that with the increase in the percentage which manufactures form of the total exports there has come a marked change in the distribution of the exports to the various sections of the world. The proportion of the total exports of the United States going to Europe is diminishing, it is now about 65 per cent; while, on the other hand, the share going to Canada, Mexico, Central America, the West Indies and South America, is increasing.—*Commercial America.*

A VOLUME OF GEOGRAPHICAL ESSAYS

Teachers of geography will welcome the publication in book form of Prof. W. M. Davis's Geographical Essays, a careful collection of papers from the pen of an American geographer who has done so much in sys-

tematising the study and presentation of geography. The book is divided into two parts,—Educational Essays, Physiographic Essays.

All of these papers have been previously presented and many are familiar to those engaged in geographical investigation and teaching. In book form, however, they are now easily accessible to those desiring to use them, and the book should be in all large public and university libraries, the departmental libraries of most colleges and normal schools, and the reference shelves of many high schools and of the best equipped teachers. It is, of course, better adapted for reference and collateral reading by teachers and investigators than as a text, but some of the essays are just the things to place in the hands of students. Those teachers who have been using some of those very papers in instruction and have found it difficult to get the original publications from inaccessible periodicals will be grateful to the author and to the editor, Prof. D. W. Johnson.

Among the Educational Essays in Part I, special mention may be made of the excellent series of chapters dealing with geography in the grammar and primary schools, in the high schools, and in the university, the discussion of methods and models in geography teaching, practical exercises, and field work. Our progress in geography in recent years is shown by the inductive study of the content of geography and its progress in the schools, a development in which Professor Davis has had such a large part in analyzing the needs, the advantages, and the defects, and pointing the way to solid advance. Many of these essays were originally presented to teachers' clubs or geographical societies and published in educational periodicals.

Among the Physiographic Essays Professor Davis's original contribution to the physiography of the lands looms large. It is a convenience to have in one volume the masterly contributions of our great geographer on the peneplain and the geographical cycle. In Part II, one finds the geographical papers of use to teachers in connection with their disciplinary value as well as their clear logical description and explanation of familiar features and processes. No student can read *The Seine, Meuse, and Moselle,* for example, as many readers of this review have themselves done, without desiring to go, and see, and try the collecting of facts, the sifting of hypotheses, and the explanation of phenomena themselves, though few could hope to make such a good story of it. Similarly the studies of the rivers and valleys in Pennsylvania and New Jersey, of river terraces in New England, of faulted mountain ranges in the Great Basin and glacially sculptured mountains in France, Switzerland, and Norway, and of shore forms of Cape Cod, are both instructive and disciplinary.

Published by Ginn & Co., New York and Boston. 772 pages. $2.75.

L. M.

BOOK NOTICES.

Little, Brown & Co., Boston, have recently added four volumes to their "Little People Everywhere" series. They are, *Gerda in Sweden, Betty in Canada, Boris in Russia,* and *Fritz in Germany.* The books are attractively bound, interestingly written and well illustrated. List price $.60 per volume.

There is a book which has been on the market for some years, and yet which is not so generally known as it ought to be. It is *Commercial Raw Materials,* by Charles R. Toothaker, Curator of the Commercial Museum of Philadelphia. It presents, among other things, some fifty maps showing in color chief sources of supply of the world's commercial products. As a rule, each map shows the distribution of only one commodity and hence it makes a vivid impression and not a confused one, as is the case with the complex maps often used for this purpose. The book is thoroughly indexed and presents its material in compact form. It is, of course, a reference book and as such, is handy and authoritative. Ginn & Co., Boston and New York.

Harry Whitney's *Hunting With the Eskimos* has recently come from the press of the Century Co. The book tells the story of the author's fourteen months among the Eskimos. It is a record of adventure and of life in the far North as actually experienced by Mr. Whitney. He shared with the Eskimos, their homes, their rude fare, their hunting hardships, and he tells the story in a modest and charming way. 453 pages, $3.50 net.

Henry Holt & Co. have recently issued an *Elementary Physiography* by Professor R. D. Salisbury of the University of Chicago, and Rand McNally & Co., a *Commercial Georgraphy* by Professor Edward Van Dyke Robinson of the University of Minnesota. Both of these books will be commented upon more fully next month.

The *Tarr and McMurry Geographies* have appeared in new form. They have not simply been revised: they have been rewritten. Most of the illustrations and all of the colored maps are new. To be reviewed later.

A Laboratory Manual in Physical Geography for use in secondary schools and colleges has recently come from the press of the Macmillan Co. The manual is the work of Prof. R. S. Tarr and Mr. O. D. von Engeln of Cornell University. To be reviewed later.

LABORATORY MAP-EXERCISE—EUROPE—PHYSICAL CONDITIONS AND HUMAN RESPONSES

(Based upon Rand, McNally & Co's Physical Wall Map of Europe)

PURPOSE: To gain a definite idea of physical features of Europe and some of the influences which they have exerted upon the development of European nations.

QUESTIONS.

NOTE: See "Explanation" of meaning of the different shades and colors employed. Note that Europe is really a peninsula projecting westward from Asia, rather than a separate continent in itself.

1. What does the dark blue color on the map signify? the pale blue? the white? the yellow? the darkest brown?
2. Note how much of Europe is in the N. Frigid zone. Is any part in the Torrid zone? What circle separates the Torrid and N. Temperate zones? In what part of the N. Temperate Zone is most of Europe? How is it in the case of the United States?
3. Locate the Prime Meridian. Define latitude; longitude.
4. Roughly, what proportion of Europe is made up of plains, that is, land less than 1000 feet in elevation? What country is a vast plain?
5. What other countries include large areas of plains? What countries are especially mountainous? Which countries would you expect to be large producers of farm crops?
6. Agriculture is much more important in Sweden than in Norway; Why?
7. Note the topography of the British Isles: which of the countries are not well suited to agriculture? Why? Remember that agriculture is the foundation industry, the world over.
8. It is believed that the British Isles were formerly attached to the mainland. How could they have been separated? Can you see any evidence on the map supporting this belief? Explain.
9. The fact that the British Isles are separated from the rest of Europe is considered to have worked to the benefit of the English. Can you suggest reasons? (Difficulty of invasion, for example.)
10. Note that a slight additional sinking of the land of N. W. Europe would convert Scandinavia into an island. Explain why. Commercially it is now practically an island. Explain why.
11. Account for the exceedingly irregular coast of Greece and the many islands in the neighborhood. Note also the coast of Norway.
12. Can you discover why an unusually large proportion of Norwegians and of Greeks become sailors, and why these countries have merchant marines of considerable importance?
13. Where is the real edge of the continent in western Europe? What are continental islands? Name some.
14. Contrast the coast of N. W. Europe with that of southern Europe. Account for the difference. Mention some possible commercial results of the difference.
15. What is an estuary? Name a few European rivers that have estuaries. To what due? What are some of the important European cities located on estuaries? Why a favorable location?
16. It is said that, outside of Russia, no part of Europe is over 400 miles from the sea. Test the truth of the statement. Remembering that peoples progress by gaining knowledge from other people, show why the above fact is important in the development of Europe.
17. What nation controls the outlet of the Black sea? of the Baltic? of the Mediterranean? Under what serious disadvantage is Russia placed in this particular?
18. Note that the mountainous parts of Europe are cut up into many small nations, while the great plain is nearly all included in one nation. Suggest reasons. (Principle involved here is important.)
19. Where do most of the large rivers outside of Russia rise? Name them. The largest two are important trade routes and have been for many centuries. Which are they?
20. What is the largest river in Europe? Where does it flow? Why are Russian rivers sluggish? What effect has this upon navigability? upon sedimetation?

(To be continued.)